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Astrobiology allows us to make predictions about **life forms** that future space missions might encounter on other planets. I study the **evolution** of micro-organisms over long periods of time, and then compare the findings with the corresponding changes in the Earth's evolution as a planet. To gather samples, our team goes to places with **extreme environments**, such as thermal springs, and parts of the sea where the salt content is high. In these extreme environments micro-organisms dominate, and scientists can study how they interact with each other. To learn about micro-organisms that lived billions of years ago, we gather and study fossil samples.

Areas of expertise:

- **Geochemistry** of **carbon** in lunar samples, meteorites, oceanic basalts and ancient (precambrian) carbonates and organic matter
- Biogeochemistry of **microbial** communities in hypersaline and hydrothermal environments
- Search for **fossil** evidence of life in **Mars**

How I first became interested in this profession:

Growing up, I enjoyed exploring caves. As graduate student in the 1970s, I studied earth science (geology), and I remember being fascinated by the lunar samples we were able to study—which were brought to Earth by earlier NASA lunar missions. This experience led to my interest in space science. Later on I became involved with biology, which added a new dimension to my research. This led to my later work on how the carbon cycle relates to Earth's history and to astrobiology.

What helped prepare me for this job:

In high school and college, I studied chemistry, physics, mathematics and geology. Also, I learned that many questions that we have about our biosphere and environment required the application of more than one of these disciplines. I learned about the scientific method, which provides a logical approach to finding answers to mysteries that intrigue me.

My role models or inspirations:

I had a great high school chemistry teacher whose enthusiasm for chemistry and all science was infectious. A college professor introduced me to the wonders of geology. My graduate school thesis advisor revealed how the power of modern analytical chemistry can unveil the early history of our biosphere

My education and training:

- Ph.D. in Geochemistry, Indiana University

My career path:

- One year as a Research Fellow at the Institute of Geophysics, University of California, Los Angeles (UCLA).
- Twenty-five years as research scientist in Exobiology, NASA Ames Research Center

What I like about my job:

I find space exploration motivating and extremely exciting because it fulfills a **natural desire**—intrinsic to human nature—to go out and search for **other forms of life**. I believe that our type of work drives the **pursuit** of **excellence** in science and technology, and I enjoy contributing to the process.

What I don't like about my job:

Most of the time, I cannot be in the lab. I spend a lot of time making sure that others in my lab can have the resources and other support that they need to do the research. But my supporting role is still a vital part of the team research effort.

My advice to anyone interested in this occupation:

As an undergraduate, be sure that you get a good foundation in chemistry, physics or mathematics, because they are the foundation of our efforts to learn the mysteries of life in the universe. As an undergraduate, try to get some experience in a research laboratory.